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EXAMINER

TYLER, NATHAN K

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/507,274	Applicant(s) MITSUNAGA, TOMOO	
	Examiner NATHAN K. TYLER	Art Unit 2625	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 March 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5,7 and 8 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5,7 and 8 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 September 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|----------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>20080527</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

1. Applicant's arguments, filed 06 March 2008, with respect to claims 1-4, 7, and 8 have been fully considered and are persuasive. The objection to claims 1-4, 7, and 8 has been withdrawn.

2. Applicant's arguments with respect to claims 1-8 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1, 2, 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Sonoda (US 20010041018 A1) and Takemoto (US 7081918 B2).

Regarding **claims 1 and 8**, Sonoda discloses an image processing apparatus and corresponding method comprising: reduced image generation means for generating a reduced image from a frame (see Fig. 3, “prescan memory” 42. “The prescan which reads the image at a low resolution” at paragraph 40); correction information acquisition means for acquiring correction information of the frame based on the reduced image (“The prescanned image data stored in the prescan memory 42 is read into the condition setting section 50 where construction of density histogram, calculation of image characteristic quantities such as average density... an image processing condition such as construction of a table (LUT) for gray balance adjustment and the like” at paragraph 73); and grayscale conversion means for converting grayscale of the frame (“The image... is subsequently subjected to various types of image processing by a table (LUT) for gray balance adjustment” at paragraph 85); wherein the grayscale conversion means corrects contrast of the frame using the correction information, as a processing to be performed before and/or after the grayscale is converted (“The image processing subsection 48c subjects the actual image data obtained by the fine scan to... contrast correction (gradation processing)... under an image processing condition determined based on the prescanned image data” at paragraph 53).

Sonoda does not explicitly disclose that the reduced image is generated based on a logarithmic luminance $\text{LogL}(p)$ of the frame.

Takemoto teaches performing logarithmic conversion on an input image (frame) before performing image processing (See Fig. 1, Log converter 4 before processing occurs at 8).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the image processing apparatus disclosed by Sonoda such that the reduced

image is generated based on a logarithmic luminance $\text{Log}L(p)$ of the frame as taught by Takemoto, so that greater processing detail is applied to lower luminance levels.

Regarding claim 2, Sonoda discloses smoothing means for generating a smoothed image having luminance L_c of pixels composing the frame smoothed based on interpolation calculation using pixels (“image data of pixels within a mask having a certain area around the pixel of interest x, y are multiplied by weighting factors in a form of normal distribution and averaged to obtain a smoothed image data” at paragraph [0059]), wherein the grayscale conversion means generate a contrast-corrected image based on luminance L_c of pixels composing the image, luminance L_I of pixels composing the smoothed image, and a predetermined gain value g (“to give an edge enhanced component $I(x,y)-\<(x, y)\>$ which is subsequently multiplied by a factor “ a ” which is a constant for adjusting the degree of sharpness enhancement” at paragraph [0059]).

While Sonoda does not disclose that the smoothing process is carried out using pixels of the reduced image, Sonoda does disclose that the reduced image is using for other image processing.

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the image processing system disclosed by Sonoda so that the smoothing process is carried out using pixels of the reduced image in order to decrease processing time, as a lower resolution image may be processed more quickly.

5. Claims 3, 4, 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Sonoda and Takemoto as applied to claim 1 above, and further in view of Gonzalez (*Digital Image Processing, Second Edition*).

Regarding **claim 3**, Sonoda discloses smoothing means for generating a smoothed image having luminance L_c of pixels composing the frame smoothed based on interpolation calculation using pixels composing the reduced image (see grounds for rejection for claim 2).

Sonoda does not disclose gain value setting means for setting a gain value g used for correcting the contrast; wherein the grayscale conversion means generate a contrast-corrected image based on luminance L_c of pixels composing the frame, luminance L_1 of pixels composing the smoothed image, and a predetermined gain value g ; and the gain value setting means can be configured so as to set the gain value g based on input initial gain value g_0 , reference gain value 1, and an attenuation value $\text{attn}(Th_1, Th_2, L_c)$ calculated using a first luminance threshold value Th_1 , a second luminance threshold value Th_2 , and luminance L_c of pixels composing the frame.

Gonzalez discloses a method for increasing the contrast of an image using a transformation using a set gain based on an initial gain, a first threshold, a second threshold, and the input luminance of the image (Gonzalez p. 85 Fig. 3.10(a). shows an example of a contrast stretching function. This function is generally expressed as $s = (255 / (\max - \min)) \times (r - \min)$ where s is the output luminance, r is the input luminance, \max is an upper threshold, and \min is a lower threshold).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the image processing system disclosed by Sonoda to include gain value setting means for setting a gain value g used for correcting the contrast; wherein the grayscale

conversion means generate a contrast-corrected image based on luminance L_c of pixels composing the frame, luminance L_l of pixels composing the smoothed image, and a predetermined gain value g ; and the gain value setting means can be configured so as to set the gain value g based on input initial gain value g_0 , reference gain value 1, and an attenuation value $\text{attn}(Th_1, Th_2, L_c)$ calculated using a first luminance threshold value Th_1 , a second luminance threshold value Th_2 , and luminance L_c of pixels composing the frame as taught by Gonzalez in order to implement contrast stretching, as contrast stretching is a well known and easily implemented method in the field of image processing.

Regarding **claim 4**, the combination of Sonoda, Takemoto, and Gonzalez as applied to claim 3 discloses conversion means for generating a tone-converted image by converting luminance L of pixels composing the frame based on a conversion function (“The image processing apparatus sets an image processing condition for performing color balance adjustment, contrast correction (gradation processing), brightness correction, saturation correction and the like, and optional corrections of transverse chromatic aberration, distortion aberration and color shift” at paragraph [008]); smoothing means for generating a smoothed image by smoothing luminance L_c of pixels composing the tone-converted image (see grounds for rejection for claim 2); wherein the contrast correction means generate a contrast-corrected image based on luminance L_c of pixels composing the tone-converted image, luminance L_l of pixels composing the smoothed image, and a gain value g ; and the gain value setting means set the gain value g based on input initial gain value g_0 , reference gain value 1, and an attenuation value $\text{attn}(Th_1, Th_2, L_c)$ calculated using a first luminance threshold value Th_1 , a second

luminance threshold value Th_2 , and luminance L_c of pixels composing the tone-converted image (see grounds for rejection for claim 3).

The combination of Sonoda and Gonzalez as applied to claim 3 does not disclose gain value setting means for setting a gain value g used for correcting the contrast based on an initial gain value g_0 which expresses an inverse $1/\gamma$, of a slope γ of the conversion function.

Gonzalez teaches performing filtering using the inverse of a known filter in order to remove the unwanted effects of the original filter (see Gonzalez p. 82, Fig. 3.7. Here the original filter is the monitor, producing the result shown in (b). By mirroring the response of the mirror about the line $y=x$, the filter shown in (c) is realized. Using this filter on the image shown in (b), the effects of the original filter are removed. Mirroring any linear function about the line $y=x$ will result in a linear function with an inverse slope of the original function).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the contrast correction system disclosed by Sonoda to include gain value setting means for setting a gain value g used for correcting the contrast based on an initial gain value g_0 which expresses an inverse $1/\gamma$, of a slope γ of the conversion function as taught by Gonzalez, in order to remove the unwanted effects of the tone correction filter.

Regarding **claim 5**, the combination of Sonoda, Takemoto, and Gonzalez as applied to claim 4 discloses the reduced image generation means generate a reduced image by converting the frame into the tone-converted image based on the conversion function and reducing a size of the tone-converted image; the correction information acquisition means acquire correction

information including a slope of the conversion function; and the grayscale conversion means correct contrast of the tone-converted image based on the reduced image and the slope of the conversion function (see grounds for rejection for claim 4).

6. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Sonoda, Takemoto, and Gonzalez as applied to claim 4 above, and further in view of Tamura et al. (US 5517333 A).

Regarding **claim 7**, the combination of Sonoda and Gonzalez as applied to claim 4 discloses hold means for holding the reduced image generated by the reduced image generation means and the correction information acquired by the correction means (Fig. 1, prescan memory, condition setting section);

The combination of Sonoda and Gonzalez does not disclose that the hold means holds the reduced image corresponding to a previous frame's image and a slope of the conversion function applied to the previous frame's image, and the grayscale conversion means corrects the contrast of the tone-converted image based on the reduced image of the previous frame and the slope of the conversion function, both stored in the hold means.

Tamura discloses an image processing system for performing gradation correction which holds correction parameters from a previous frame and applies them to a current frame ("the correction coefficient (.gamma.) for the previous frame held in a correction gamma register 17... the adder 36 provides the same correction coefficient as that of the previous frame").

It would have been obvious at the time the invention was made to one of ordinary skill in the art to modify the image processing system disclosed by the combination of Sonoda and

Gonzalez so that the hold means holds the reduced image corresponding to a previous frame's image and a slope of the conversion function applied to the previous frame's image, and the grayscale conversion means corrects the contrast of the tone-converted image based on the reduced image of the previous frame and the slope of the conversion function, both stored in the hold means as taught by Tamura so that correction information need not be calculated for each frame, improving processing speed.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to NATHAN K. TYLER whose telephone number is (571)270-1584. The examiner can normally be reached on M-F 7:30am - 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, King Poon can be reached on 571-272-7440. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/King Y. Poon/
Supervisory Patent Examiner, Art Unit 2625

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